

Mir crew conducts space walks, harvests wheat

Cosmonaut Researcher John Blaha and his Mir 22 crewmates have spent the past two weeks conducting the first two space walks of the mission and harvesting the first crop of healthy plants grown on orbit.

In the six-and-one-half-hour space walk performed last Monday, Commander Valery Korzun and Flight Engineer Alexander "Sasha" Kaleri finished installing the cooperative solar array to the exterior of the Kvant-1 module to boost the Mir's electrical generation capacity. The space walk completed work begun the previous week. The two cosmonauts also installed a navigation antenna to the station's docking module to aid future dockings of Progress re-supply vehicles.

Blaha described some of the activity as he downlinked video to the Russian mission control center this week.

"Another thing Valeri and Sasha did on this EVA was they repaired our transceiver system that we use to talk to amateur operators all around the world," Blaha said. "They had quite a bit of equipment they were trying to move, and I was very impressed with all their

work. They lived in those suits for nine hours and did a fantastic job. We had a lot of good work that day and I look forward to working with them here for another month yet."

Blaha monitored the space walks from inside the station as Korzun and Kaleri did their work outside. In an interview last week, Blaha was asked if he felt any envy about not getting to walk in space himself.

"It's something that at one time I really wanted to do, but when I was involved with the shuttle as the pilot and commander we're not allowed to do that. In (the shuttle/Mir) program we are, and on the next mission ... Jerry Linenger will participate in a space walk with a Russian cosmonaut, so that will be quite an event."

Regarding the harvest of plants grown through a complete life cycle, Blaha pointed out that, in space, the near absence of gravity means there is one less thing affecting the way plants grow, thus allowing for a more controlled experiment. Scientists can

study other factors such as light, temperature and nutrients in order to learn how each of those elements influence plants without the presence of gravity.

In "Project Greenhouse," 32 plants of a super-dwarf wheat variety were harvested as part of a joint cooperative initiative with NASA; Utah State University, Logan, Utah; the Institute of Biomedical Problems Research Center in Moscow; and the Space Research Institute of the Bulgarian Academy of Sciences in Sofia. Unlike previous short-term experiments, these plants were allowed to develop at a normal growth rate and appear to have matured fully to produce the desired seed-containing heads, project scientists report.

"The development of plant-based, regenerative life support systems is critical to sustaining a crew during long-duration missions such as Mars exploration," said David Bubenheim, project co-investigator at NASA's Ames Research Center.

"Successful growth of the wheat crop through all developmental phases, culminating in the harvest of seeds, demonstrates that the environment of space poses no obstacles to the biological components of a regenerative life support system," he added.

"This information is critical for the future application of these systems to recycle wastes and provide a crew with water, air and food. This, in turn, makes the crew self-sufficient, thereby enabling the practical and economical exploration of space."

Additional information on the effect of environmental factors on the plants will be provided by a second experiment currently underway on Mir. Immediately following the first harvest, the crew planted a second set of wheat seeds. These plants will be frozen when about forty days old and returned to Earth for biochemical analysis. This will provide the first opportunity to analyze the biochemistry of growing green plants as they were in space, before their fast-paced biochemical processes have a chance to re-acclimate to Earth's gravity, according to project scientists.



Flight dynamics hangs STS-80 plaque in MCC

The Flight Dynamics team was given the honor of hanging the STS-80 plaque in Mission Control after executing the first NASA mission involving tracking and rendezvous of three separately orbiting spacecraft.

Two individuals were awarded the traditional honor of climbing the ladder and hanging the plaque. Bill Britz, the lead Flight Dynamics Officer, shared the honors of hanging the plaque with Matt Abbot, the Ascent Flight Dynamics Officer.

"Britz and his team demonstrated leadership and innovation in new software tools development," said Lead Flight Director Al Pennington. "Abbot and his team demonstrated technical excellence, and a coolness during crisis."



Britz

Britz and his team developed and executed a new flight profile. The team successfully completed the first NASA mission involving three spacecraft, the Space Shuttle *Columbia*, the Wake Shield Facility and ORFEUS-SPAS, in close proximity to each other. Abbot and his team executed a complete reconfiguration of all the Flight Dynamics Officer ascent trajectory monitoring after a software malfunction thus averting a hold in the STS-80 countdown.



JSC Photo

TOYS FOR TOTS—From left, Astronaut Rick Sturckow, JSC Director George Abbey, Staff Sgt. Rebecca Chandler and Lance Cpl. Luis Fuhlbrigge kick off JSC's participation in the U.S. Marines "Toys for Tots" program in Bldg. 3 last Friday. In addition, Dyncorp, the aircraft, maintenance and modification contractor at Ellington Field, sold tickets to their company Christmas party. The money raised was used to purchase toys for the Toys for Tots program. Last Friday, employees went to purchase their toys at the Venture store. The store is currently promoting free merchandise to every 50th customer in line and Dyncorp was rewarded with that honor. Employees were able to purchase double the amount of toys originally planned. Employees may donate unwrapped toys in Bldg. 3 through today.

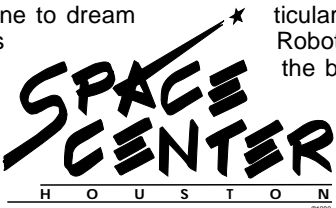
Eva joins Space Center team in status center

Her name is Eva and she welcomes visitors to Space Center Houston's Mission Status Center with blinking eyes and lighted fiber optic hair.

The newest addition to SCH, unveiled to the public last month, stands 5'8" tall and is the latest in human-like robotics. Her 26 robotic functions make her a "showbot" of the status center.

"Eva should entice everyone to dream about how telecommunications can bring our worlds closer together," said Mike Turner, regional president of Southwestern Bell and sponsor of the status center. "We hope that visitors to our exhibit will find Eva informative and entertaining and that they'll learn more about how cutting-edge technology and space exploration can shape their future."

Turner, along with SCH General Manager Richard Allen and board members Benard Harris and Joe Bailey, cut the ribbon last month to officially open Eva to guests of SCH. During the event, a special message was relayed to guest gathered for the ribbon-cutting ceremony.



"The entire STS-80 crew extends its greetings to everyone gathered at Space Center Houston to welcome Eva to the planet Earth," said Commander Ken Cockrell from low-Earth orbit. "From what we hear, Eva will have a lot to teach us about the future and the wonders of cutting-edge communications."

Eva was named after her particular role in space technology. Robots will be an integral part of the building of the International Space Station and the majority of work will be done as Extravehicular Activity, or EVA.

Eva's role at the status center is to welcome guest to her world. She describes how telecommunications has developed during the 21st century and emphasizes points by movements of hands, fingers, even raising her eyebrow now and then. Her introduction leads visitors into the real world of space where they are given a behind-the-scenes look at the current space program and what is happening minute by minute.



Eva the newest addition to Space Center Houston's Mission Status Center greets guests with blinking eyes and lighted fiber optic hair.

Director praises employees' work

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work environment for our employees, has been opened to surrounding communities for their use during hurricanes, floods, and other emergencies. These efforts underscore our commitment to ensuring that people outside the center's perimeter fences can see what we're doing and better understand how our efforts benefit them.

In the midst of all we have accomplished, and all that is ahead of us, we also recognize that the environment in which we work is changing. The country is in the process of re-examining its priorities. Congress and the Administration are searching for new ways to further reduce the size of government and to trim the budget. NASA and the Johnson Space Center are not exempt—we have already felt many of the effects, and there are more ahead.

We should all take pride in our accomplishments this year, but we also must remember that we have many challenges and opportunities ahead of us. The future will demand the best we have to offer and will challenge us in new and unexpected ways.

I thank you for your hard work and dedication, for your attention to details and for your "can do" spirit. My heartfelt wishes for a joyous holiday season are extended to each and everyone of you and your families.